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Environmental Compliance Audit

Clean Air Act Emergency Order CAA-02-2021-1003

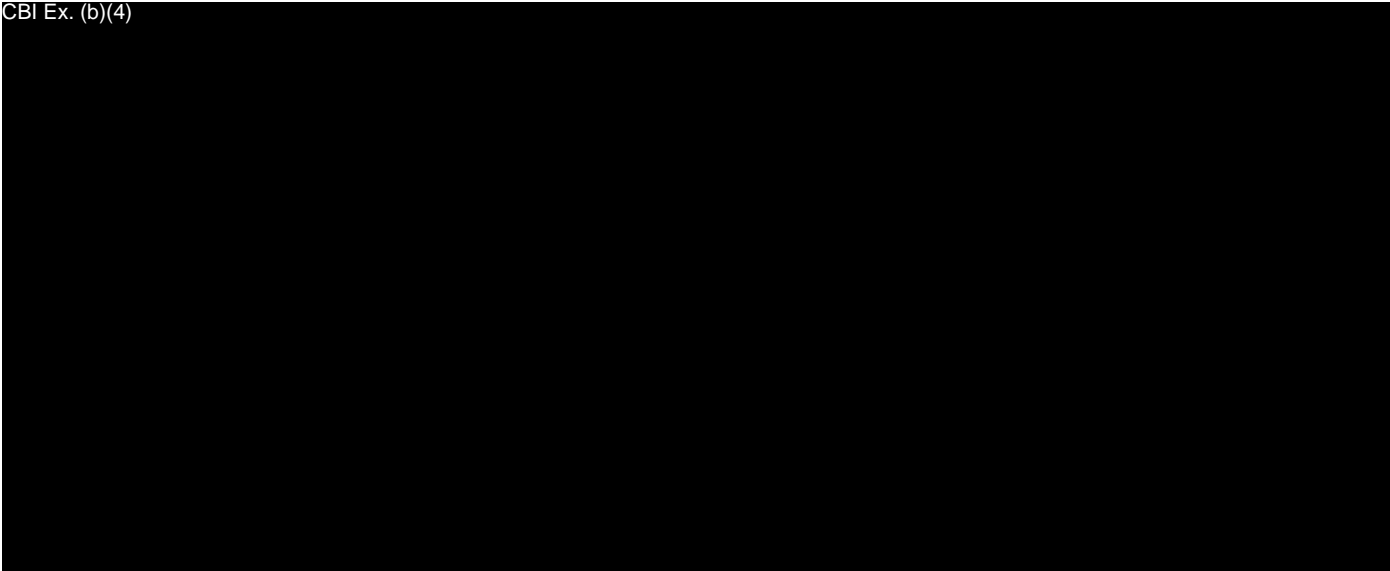
Limetree Bay Refining, LLC

Christiansted, US Virgin Islands

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1.0 Background

This independent third-party audit of the Limetree Bay Refining, LLC (“LBR”) Refinery on St. Croix in the US Virgin Islands was conducted in response to an emergency order (the “Order”) dated May 14, 2021, from the United States Environmental Protection Agency (“EPA”). The Order, in response to releases at LBR, mandated that LBR contract with independent, qualified third-party auditors in order to audit (1) the environmental program and (2) process safety. CBI Ex. (b)(4)

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1.1 Limetree Bay Refinery

The LBR Refinery (the “Refinery”) and associated marine loading and storage terminal (the “Terminal”) is situated along the southern shore of the island of St. Croix, aligned centrally relative to the island’s west and east coasts. The Refinery started operating under the Hess Oil Virgin Islands Corporation (“HOVIC”) in 1965. Control of the Refinery shifted to a joint venture named HOVENSA, which was formed by Amerada Hess Corporation, the parent company of HOVIC, and Petroleos de Venezuela S.A., in 1998. In 2011, HOVENSA, the US, and US Virgin Islands entered into a Consent Decree (“CD”) that required various environmental commitments from HOVENSA. HOVENSA ceased operations at the Refinery in 2012.

After being idled for several years, HOVENSA declared Chapter 11 bankruptcy in 2015 and the Refinery was acquired during bankruptcy proceedings by LBR, who intended to restart its operation. CBI Ex. (b)(4)

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Operations at the Refinery were halted in

May 2021, and on June 21, 2021, LBR announced via press release that it was suspending plans to restart the Refinery indefinitely due to severe financial constraints.

1.2 EPA Order

On May 14, 2021, EPA issued the Order to LBR requiring the Refinery to cease operations for a maximum of 60 days and to have their environmental and process safety programs audited. This

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order was issued in response to releases at the Refinery that occurred over the course of the startup. A detailed discussion of those four (4) releases is provided in the Order, where they are named as follows:

- 1) February Incident
- 2) Late April Incident
- 3) First May Incident
- 4) Second May Incident

The Order required LBR to submit the names of prospective independent third-party auditors to EPA for review. EPA then informed LBR of those auditors that they deemed qualified to conduct the Environmental Compliance Audit, at which point LBR could select a qualified auditor to conduct the Audit. CBI Ex. (b)(4)

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As part of the Order, CBI Ex. (b)(4) is required to certify that the Auditor has remained in compliance with all of the conditions set forth in Paragraph 115.e¹. CBI Ex. (b)(4)

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¹ As required under Paragraph 115.k.vi of the Order.

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1.4.3 Distribution of Audit Report

The Order requires distribution of the Audit Report to the following individuals⁶:

Robert Buettner, Chief
Air Compliance Branch
Enforcement and Compliance Assurance Division
buettner.robert@epa.gov

Nancy Rodriguez, Chief
Multimedia Permits and Compliance Branch
Caribbean Environmental Protection Division
US EPA, Region 2
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Air Enforcement Division
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Liliana Villatora, Chief, Air Branch
US EPA, Region 2
Office of Regional Counsel
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⁵ As required under Paragraph 115.k.iii of the Order.

⁶ As required under Paragraphs 116 and 117 of the Order.

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Sara Froikin, Assistant Regional Counsel
US EPA, Region 2
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⁷ As required under Paragraph 115.d of the Order, which requires the Audit “to be completed by the earlier of 30 days after EPA’s approval of a list of auditors for a given Audit Category pursuant to subparagraph (f) of this paragraph or 42 days after issuance of this Order.” CBI Ex. (b)(4)

The Order was issued on May 14, and 42 days after that is June 25. Therefore, the Audit was required to be completed by June 25, the earlier of the two calculated deadlines.

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#	Order Reference	Findings and Recommendations
1	115.i.i	CBI Ex. (b)(4)
2	115.i.ii.1	<p>From February 1 through May 27, 2021, a period of 2,760 hours, there were 40 periods spanning a total duration of 666 hours (24%) that showed an exceedance of the NSPS Ja rolling 3-hour average H₂S limit of 162 ppmvd at Flare No. 8. CBI Ex. (b)(4)</p> <p>While over half of the exceedance events were rectified within 4 hours, CBI Ex. (b)(4), 18 of the 40 events took longer than 4 hours to resolve, eight (8) of which took longer than a day to resolve. CBI Ex. (b)(4)</p> <p>CBI Ex. (b)(4)</p>
3	115.i.ii.1	<p>From February 1 through May 27, 2021, a period of 2,760 hours, there were 40 periods spanning a total duration of 595 hours (22%) that showed an exceedance of the NSPS J rolling 3-hour average H₂S limit of 162 ppmvd at the East Mix Drum Fuel Gas System. CBI Ex. (b)(4)</p> <p>Only 15 of the 40 exceedance events (38%) were rectified within 4 hours. Eight (8) of the events (20%) took longer than a day to resolve. CBI Ex. (b)(4)</p>
4	115.i.ii.1	<p>From February 1 through May 27, 2021, a period of 2,760 hours, there were 10 periods spanning a total duration of 63 hours (2%) that showed an exceedance of the Title V rolling 3-hour average H₂S limit of 75 ppmv at the Coker Mix Drum Fuel Gas System. One of those events, spanning 3/19-3/20, also showed an exceedance of the NSPS J rolling 3-hour average H₂S limit of 162 ppmvd. CBI Ex. (b)(4)</p>

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#	Order Reference	Findings and Recommendations
5	115.i.ii.2	CBI Ex. (b)(4)
6	115.i.ii.3	CBI Ex. (b)(4)
7	115.i.ii.3	CBI Ex. (b)(4)
8	115.i.ii.4	<p>The average pressure among the 17 events when opening the drum to atmosphere was 5 psig, well over the 2-psig limit. Only eight (8) of the 17 decoking events (47%) identified by coker drum valve opening were started when the pressure in the drum was 2 psig or less. The remaining events saw the valve open at pressures as high as ~30 psig and then the coker drum depressurized rapidly.</p> <p>CBI Ex. (b)(4)</p>
9	115.i.ii.4	CBI Ex. (b)(4)
10	115.i	CBI Ex. (b)(4)
11	115.i	<p>CBI the sulfur-laden releases associated with the three (3) most recent incidents referenced in the Order, CBI Ex. (b)(4)</p>

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2.2 Environmental Staffing

Per the Order⁸, the Audit was required to include:

An evaluation of staffing within the environmental, health and safety program at the Refinery including staffing levels and whether staff have proper academic background, experience, and training to ensure the Refinery operates within required environmental, health, and safety limits and avoids situations or condition that endanger public health or welfare or the environment;

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⁸ Required under Paragraph 115.i.i of the Order.

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It is worth noting that the terms “HSE Department” and “Environmental Department” were used interchangeably within the Order⁹, CBI Ex. (b)(4)

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the statement in the Order that “A Refinery of this size and complexity would be expected to have 10-20 full time onsite staff in its health, safety and environment department.”¹⁰ CBI Ex. (b)(4)

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⁹ See Paragraph 91 of the Order.

¹⁰ See Paragraph 92 of the Order.

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2.3 Clean Air Act Compliance

With respect to Clean Air Act (“CAA”) compliance, the Order requires the following¹⁵:

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¹⁵ Required under Paragraph 115.i.ii of the Order.

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A review of CAA compliance at the Refinery since February 2021, with a summary of all non-compliance and recommended steps to prevent future noncompliance, including at a minimum:

- 1) Exceedances of NSPS Subpart J and Ja and permit H₂S limits at Flare #8 and the East Mix Drum and Coker Mix Drum Fuel Gas Systems;
- 2) Compliance with all NSPS Subpart Ja requirements for flare incidents that exceed the 500 pound per day threshold;
- 3) Compliance with the obligations of the Flare Management Plan submitted pursuant to NSPS Subpart Ja and NESHAP Subpart CC; and
- 4) An evaluation of compliance for releases at the coker unit with particular emphasis on the miscellaneous process vent requirements of NESHAP Subpart CC and the coker steam vent requirements of NESHAP Subpart CC.

As background, New Source Performance Standards (“NSPS”) codified in Title 40 of the Code of Federal Regulations (“40 CFR”) Part 60 are intended to reduce emissions of federally regulated criteria pollutants from a particular source category. For petroleum refineries, NSPS Subparts J and Ja are relevant, with Subpart Ja regulating refineries for which construction, reconstruction, or modification commenced after May 14, 2007. Though the Refinery pre-dates 2007, one of the stipulations of the 2011 CD was that the flares at the Refinery would follow NSPS Ja regulations, with delayed compliance dates. Flare No. 8, also known as the FCCU Low Pressure Flare, was scheduled to be subject to the requirements of NSPS Ja seven (7) years from the date of entry of the CD¹⁶ and is therefore now subject to NSPS Ja.

Additionally, National Emission Standards for Hazardous Air Pollutants (“NESHAP”) codified in 40 CFR Part 63 are intended to reduce emissions of federally regulated hazardous air pollutants from a particular source category. These regulations are also referred to as Maximum Achievable Control Technology (“MACT”) standards. For petroleum refineries, MACT CC is relevant. MACT CC has sitewide applicability and includes standards, monitoring, and recordkeeping/reporting requirements for various units at a refinery such as flares, delayed coking units, and miscellaneous process vents.

¹⁶ See Appendix D in the 2011 Consent Decree (Document 34).

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2.3.1 H₂S Limits: NSPS J, NSPS Ja, and Title V Permit

Flare No. 8, the East Mix Drum Fuel Gas System, and the Coker Mix Drum Fuel Gas System are subject to various H₂S limits, as summarized in the following table.

Table 2-4 H₂S Limits by Operational Units

Fuel Gas System	Unit	Limit	Limit Time Basis*	Source of Limit
	Flare No. 8	162 ppmvd (0.10 gr/dscf)	rolling 3-hour average	Title V: Sections 3.2.5.5 & 3.2.5.6; NSPS Ja [§60.102a(g)(1)]
East Mix Drum Fuel Gas System	#5CDU Crude Charge Heaters H-3101 A/B #3 VAC Heaters H-4201, H-4202 #3 Platformer Hydrobon H-4401, H-4402 #4 Platformer H-5401, H-5402, H-5451, H-5452, H-5453, H-5454, H-5455 #6DD Heaters H-4601 A/B, H-4602 #7DD Heaters H-4301 A/B, H-4302 #9DD Heaters H-5301 A/B, H-5302** East SRU Incinerator (H-4745) Fired Boilers No. 8 & 9 (B-3303 & B-3304)	162 ppmvd (0.10 gr/dscf)	rolling 3-hour average	Title V: Section 3.2.2.1.10 (H-3101 A/B only) NSPS J [§60.105(e)(3)(ii)]
Coker Mix Drum Fuel Gas System	Coker Heaters H-8501A and H-8501B (Title V Permit STX-TV-003-10, Group 02G)	75 ppmvd	rolling 3-hour average	Title V: Section 3.1.2.7.2
		162 ppmvd (0.10 gr/dscf)	rolling 3-hour average	Title V: Sections 3.2.2.6.1 & 3.2.2.6.2; NSPS J [§60.105(e)(3)(ii)]

* - No annual H₂S limits exist for the units evaluated in this Audit.

** - Heater H-5302 operated intermittently during the time period evaluated in this Audit.

Flare No. 8

Hourly H₂S data from the Flare No. 8 H₂S CMS were obtained from the LBR staff and reviewed for this Audit. The following table lists those periods during which the rolling 3-hour average H₂S concentration observed at Flare No. 8 exceeded the NSPS Ja limit of 162 ppmvd¹⁷, which is also

¹⁷ See 40 CFR §60.102a(g)(1).

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listed in Sections 3.2.5.5. and 3.2.5.6. of Title V Permit No. STX-TV-003-10, along with the duration of each event as well as the maximum 3-hour rolling average observed during each event. All times presented in this report are Local Standard Time. Daylight Savings Time is not observed in the US Virgin Islands.

Table 2-5 NSPS Ja H₂S Exceedances at Flare No. 8

Event	Start Time	End Time	Duration (hr)	Max 3-hr Average (ppm)
1	2/1/2021 0:00	2/5/2021 22:00	118	8,652.7
2	2/6/2021 0:00	2/9/2021 18:00	90	3,539.8
3	2/9/2021 20:00	2/9/2021 23:00	3	189.4
4	2/10/2021 9:00	2/10/2021 11:00	2	212.6
5	2/11/2021 14:00	2/13/2021 4:00	38	5,668.4
6	2/15/2021 0:00	2/15/2021 3:00	3	166.0
7	2/15/2021 7:00	2/15/2021 11:00	4	431.2
8	2/16/2021 14:00	2/19/2021 7:00	65	2,012.0
9	2/24/2021 11:00	2/24/2021 13:00	2	190.8
10	2/27/2021 6:00	3/1/2021 17:00	59	952.7
11	3/2/2021 0:00	3/2/2021 4:00	4	332.6
12	3/2/2021 6:00	3/2/2021 9:00	3	179.1
13	3/2/2021 10:00	3/3/2021 23:00	37	1,608.1
14	3/4/2021 7:00	3/5/2021 2:00	19	958.6
15	3/10/2021 18:00	3/10/2021 21:00	3	202.2
16	3/11/2021 6:00	3/11/2021 11:00	5	277.3
17	3/15/2021 16:00	3/15/2021 18:00	2	185.3
18	3/19/2021 10:00	3/19/2021 13:00	3	219.4
19	3/20/2021 17:00	3/21/2021 0:00	7	837.7
20	3/21/2021 20:00	3/21/2021 21:00	1	167.1
21	3/22/2021 19:00	3/22/2021 22:00	3	224.1
22	3/29/2021 22:00	3/30/2021 9:00	11	284.0
23	3/30/2021 10:00	3/30/2021 13:00	3	197.3
24	4/14/2021 15:00	4/14/2021 18:00	3	171.4
25	4/15/2021 15:00	4/15/2021 17:00	2	168.3
26	4/19/2021 7:00	4/19/2021 9:00	2	162.7
27	4/19/2021 16:00	4/22/2021 17:00	73	39,475.7
28	4/22/2021 21:00	4/24/2021 0:00	27	91,649.0
29	4/25/2021 15:00	4/25/2021 23:00	8	842.4
30	4/27/2021 3:00	4/27/2021 6:00	3	191.7
31	4/29/2021 7:00	4/29/2021 13:00	6	271.1
32	5/2/2021 19:00	5/3/2021 10:00	15	993.4
33	5/3/2021 13:00	5/3/2021 17:00	4	1,198.4
34	5/4/2021 17:00	5/4/2021 20:00	3	475.4
35	5/5/2021 20:00	5/5/2021 23:00	3	183.1
36	5/7/2021 22:00	5/8/2021 2:00	4	377.0
37	5/12/2021 2:00	5/12/2021 8:00	6	536.0
38	5/12/2021 15:00	5/13/2021 1:00	10	2,173.3
39	5/14/2021 0:00	5/14/2021 9:00	9	669.4
40	5/20/2021 4:00	5/20/2021 7:00	3	236.2

FINDING/RECOMMENDATION #2

From February 1 through May 27, 2021, a period of 2,760 hours, there were 40 periods spanning a total duration of 666 hours (24%) that showed an exceedance of the NSPS Ja rolling 3-hour average H₂S limit of 162 ppmvd at Flare No. 8. CBI Ex. (b)(4)

While over half of the exceedance events shown in Table 2-5 were rectified within 4 hours, CBI Ex. (b)(4) 18 of the 40 events took longer than 4 hours to resolve, eight (8) of which took longer than a day to resolve. CBI Ex. (b)(4)

East Mix Drum Fuel Gas System

Hourly H₂S data from the East Mix Drum Fuel Gas System H₂S CMS were obtained from the LBR staff and reviewed for this Audit. The East Mix Drum Fuel Gas System, which provides fuel to many heaters at the Refinery, is also limited to rolling 3-hour average H₂S concentrations of 162 ppmvd in the fuel gas, albeit due to NSPS J applicability. The following table lists those periods during which the rolling 3-hour average H₂S concentration observed at the East Mix Drum Fuel Gas System exceeded the NSPS J limit of 162 ppmvd listed in 40 CFR §60.105(e)(3)(ii), along with the duration of each event as well as the maximum 3-hour rolling average observed during each event.

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Table 2-6 NSPS J H₂S Exceedances at the East Mix Drum Fuel Gas System

Event	Start Time	End Time	Duration (hr)	Max 3-hr Average (ppm)
1	2/1/2021 0:00	2/1/2021 22:00	22	654
2	2/1/2021 23:00	2/2/2021 2:00	3	263
3	2/3/2021 6:00	2/3/2021 7:00	1	171
4	2/4/2021 16:00	2/5/2021 6:00	14	560
5	2/7/2021 5:00	2/7/2021 8:00	3	171
6	2/7/2021 11:00	2/7/2021 16:00	5	176
7	2/8/2021 3:00	2/8/2021 4:00	1	163
8	2/8/2021 5:00	2/8/2021 23:00	18	734
9	2/9/2021 0:00	2/9/2021 6:00	6	797
10	2/11/2021 18:00	2/11/2021 23:00	5	566
11	2/12/2021 6:00	2/12/2021 20:00	14	1,117
12	2/16/2021 9:00	2/16/2021 23:00	14	565
13	2/20/2021 23:00	2/21/2021 2:00	3	179
14	2/26/2021 5:00	2/26/2021 12:00	7	477
15	3/3/2021 14:00	3/3/2021 18:00	4	220
16	3/10/2021 7:00	3/10/2021 11:00	4	689
17	3/10/2021 13:00	3/10/2021 16:00	3	175
18	3/18/2021 2:00	3/19/2021 7:00	29	1,410
19	3/19/2021 9:00	3/20/2021 19:00	34	1,397
20	3/20/2021 21:00	3/20/2021 23:00	2	165
21	3/21/2021 0:00	3/25/2021 8:00	104	1,875
22	3/26/2021 12:00	3/29/2021 18:00	78	1,828
23	3/29/2021 19:00	3/30/2021 2:00	7	463
24	4/13/2021 22:00	4/14/2021 1:00	3	203
25	4/18/2021 11:00	4/18/2021 19:00	8	595
26	4/18/2021 21:00	4/18/2021 22:00	1	172
27	4/19/2021 13:00	4/19/2021 17:00	4	868
28	4/20/2021 5:00	4/21/2021 8:00	27	1,823
29	4/21/2021 9:00	4/21/2021 13:00	4	207
30	4/21/2021 15:00	4/21/2021 18:00	3	179
31	4/22/2021 3:00	4/23/2021 22:00	43	1,884
32	4/25/2021 13:00	4/25/2021 22:00	9	629
33	4/29/2021 11:00	5/1/2021 12:00	49	924
34	5/1/2021 14:00	5/2/2021 0:00	10	372
35	5/4/2021 3:00	5/4/2021 20:00	17	384
36	5/5/2021 15:00	5/5/2021 21:00	6	819
37	5/6/2021 15:00	5/7/2021 0:00	9	332
38	5/8/2021 6:00	5/8/2021 17:00	11	460
39	5/8/2021 21:00	5/9/2021 4:00	7	463
40	5/11/2021 8:00	5/11/2021 11:00	3	203

FINDING/RECOMMENDATION #3

From February 1 through May 27, 2021, a period of 2,760 hours, there were 40 periods spanning a total duration of 595 hours (22%) that showed an exceedance of the NSPS J rolling 3-hour average H₂S limit of 162 ppmvd at the East Mix Drum Fuel Gas System. CBI Ex. (b)(4)

Only 15 of the 40 exceedance events (38%) shown in Table 2-6 were rectified within 4 hours. Eight (8) of the events (20%) took longer than a day to resolve.

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Coker Mix Drum Fuel Gas System

Hourly H₂S data from the Coker Drum Fuel Gas System H₂S CMS were obtained from the LBR staff and reviewed for this Audit. The Coker Mix Drum Fuel Gas System, which provides fuel to Coker Heaters H-8501A and H-8501B at the Refinery, is also limited to rolling 3-hour average H₂S concentrations of 162 ppmvd in the fuel gas due to NSPS J applicability. However, Title V Permit STX-TV-003-10 contains a more stringent H₂S limit of 75 ppmv over a rolling 3-hour average. The following table lists those periods during which the rolling 3-hour average H₂S concentration observed at the Coker Mix Drum Fuel Gas System exceeded the Title V Permit limit of 75 ppmvd, along with the duration of each event as well as the maximum 3-hour rolling average observed during each event.

Table 2-7 Permit H₂S Exceedances at the Coker Mix Drum Fuel Gas System

Event	Start Time	End Time	Duration (hr)	Max 3-hr Average (ppm)
1	3/18/2021 12:00	3/18/2021 19:00	7	111.5
2	3/19/2021 6:00	3/20/2021 0:00	18	162.5
3	3/20/2021 16:00	3/21/2021 4:00	12	122.0
4	3/21/2021 6:00	3/21/2021 8:00	2	85.0
5	3/24/2021 11:00	3/24/2021 14:00	3	105.0
6	4/21/2021 4:00	4/21/2021 8:00	4	123.0
7	5/3/2021 18:00	5/3/2021 23:00	5	87.3
8	5/4/2021 12:00	5/4/2021 14:00	2	77.0
9	5/4/2021 15:00	5/4/2021 16:00	1	76.0
10	5/4/2021 19:00	5/5/2021 4:00	9	137.3

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FINDING/RECOMMENDATION #4

From February 1 through May 27, 2021, a period of 2,760 hours, there were 10 periods spanning a total duration of 63 hours (2%) that showed an exceedance of the Title V rolling 3-hour average H₂S limit of 75 ppmv at the Coker Mix Drum Fuel Gas System. One of those events, spanning 3/19-3/20, also showed an exceedance of the NSPS J rolling 3-hour average H₂S limit of 162 ppmvd. CBI [REDACTED]

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2.3.2 SO₂ Limits: NSPS Ja

As previously mentioned, Flare No. 8 is subject to NSPS Ja requirements per the 2011 CD. C

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[REDACTED] NSPS Ja requires a regulated entity to conduct a root cause analysis (“RCA”) and a corrective action analysis whenever SO₂ emissions from a flare exceed the 500-lb/day threshold¹⁸. The following table includes a list of NSPS Ja recordkeeping and reporting requirements for such incidents.

Table 2-8 NSPS Ja Requirements for 500-lb/day SO₂ Events

Requirement	NSPS Ja Citation
Records of discharges greater than 500 lb SO ₂	§60.108a(c)(6)
Description of the discharge	§60.108a(c)(6)(i)
Date and time discharge was first identified and the duration	§60.108a(c)(6)(ii)
Quantity of gas discharged for each 24-hour period	§60.108a(c)(6)(iii)
Measured TRS or measured H ₂ S & estimated sulfur concentration	§60.108a(c)(6)(iv)
Cumulative quantity of H ₂ S and SO ₂ released into the atmosphere	§60.108a(c)(6)(vii)
Steps taken to limit emissions during the discharge	§60.108a(c)(6)(viii)
The RCA	§60.108a(c)(6)(ix)
For a corrective action analysis, status/schedule of corrective actions	§60.108a(c)(6)(x)
Identification of RCA exemptions due to planned startups/shutdowns	§60.108a(c)(6)(xi)

Hourly Total Reduced Sulfur (“TRS”) data from the Flare No. 8 TRS CMS along with vent gas flows and calculated hourly SO₂ emissions from Flare No. 8 were obtained from the LBR staff and reviewed for this Audit. The following incidents were identified as having exceeded the 500-lb/day

¹⁸ See 40 CFR §60.103a(c)(1)(i).

SO₂ threshold since February 2021, and the associated RCA documentation prepared by LBR for each event is also identified.

Table 2-9 NSPS Ja 500-lb/day SO₂ Events since February 2021

Event	Start Time	End Time	# of 24-hr Events (hr)	Max 24-hr Release (lb)	RCA Documentation
1	2/1/2021 0:00	2/10/2021 11:00	227	10,624.2	Yes - Document 18a
2	2/12/2021 1:00	2/13/2021 21:00	44	2,168.2	Yes - Document 18b
3	2/15/2021 7:00	2/20/2021 1:00	114	2,127.8	Yes - Document 18c
4	2/20/2021 22:00	2/21/2021 7:00	9	513.8	Yes - Document 18d
5	2/21/2021 10:00	2/21/2021 20:00	10	503.6	Yes - Document 18d
6	2/22/2021 0:00	2/24/2021 4:00	52	715.2	Yes - Document 18e
7	2/24/2021 19:00	2/24/2021 21:00	2	503.2	Yes - Document 18f
8	2/28/2021 7:00	3/5/2021 6:00	119	1,475.3	Yes - Document 18g
9*	3/20/2021 13:00	3/21/2021 22:00	9	560.3	Yes - Document 18h
10*	3/25/2021 13:00	3/26/2021 23:00	34	627.0	Yes - Document 18i
11	4/19/2021 21:00	4/22/2021 2:00	53	5,605.0	Yes - Document 18j
12	4/22/2021 6:00	4/24/2021 16:00	58	8,446.6	Yes - Document 18k
13	5/3/2021 13:00	5/3/2021 22:00	9	602.9	Yes - Document 18l

* - Event was identified as exceeding the 500-lb/day limit despite the CEMS data being flagged as invalid. Event was still flagged as an exceedance by LBR, and an RCA was conducted and documented.

Thirteen events were identified using the 24-hour SO₂ data for Flare No. 8. CBI Ex. (b)(4)

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

CBI Ex. (b)(4)

2.3.3 Flare Management Plan: NSPS Ja and MACT CC

LBR developed a Flare Management Plan (“FMP”) as required by NSPS Ja and MACT CC. This FMP, dated January 30, 2020, was submitted to the Virgin Islands Department of Planning and Natural Resources (“VIDPNR”) and emailed as required to EPA²⁰. The FMP includes both Flare No. 3 (not yet operated) and Flare No. 8 (started on September 15, 2020), CBI Ex. (b)(4)

The FMP was developed prior to commencing flare operations at the Refinery, so it was based on the best available information at the time of its development as opposed to actual operating data.

The FMP is required to contain the information listed in the following table, which also identifies the location of that specific required information within the LBR FMP.

¹⁹ Required under 40 CFR §60.103a(d).

²⁰ Required under 40 CFR §60.103a(b)(3) and 40 CFR §63.670(o)(2)(iii). CBI Ex. (b)(4)

CBI Ex. (b)(4)

Table 2-10 FMP Requirements: NSPS Ja/MACT CC

Summary of Requirement	Regulatory Citation	Location in FMP
A listing of all refinery process units, ancillary equipment, and fuel gas systems connected to the flare for each affected flare.	§60.103a(a)(1) §63.670(o)(1)(i)	Section 2.3
An assessment of whether discharges to affected flares from these process units, ancillary equipment and fuel gas systems can be minimized.	§60.103a(a)(2) §63.670(o)(1)(ii)	Sections 3.2-3.6
A description of each affected flare.	§60.103a(a)(3) §63.670(o)(1)(iii)-(v)	Sections 2.1-2.11 Appendices B & C
An evaluation of the baseline flow to the flare.	§60.103a(a)(4)	Section 3.7
Pressure relief device inventory and data	§63.670(o)(1)(vi)	At Refinery, as allowed by rule
Procedures to minimize or eliminate discharges to the flare during planned startup and shutdown	§60.103a(a)(5) §63.670(o)(1)(vii)	Section 3.3
Procedures to reduce flaring in cases of fuel gas imbalance	§60.103a(a)(6)	Section 3.4 Appendix I
For flares equipped with flare gas recovery systems, procedures to minimize the frequency and duration of outages of the flare gas recovery system and procedures to minimize the volume of gas flared during such outages	§60.103a(a)(7)	N/A

CBI Ex. (b)(4)

CBI Ex. (b)(4)

In addition to the requirements regarding the fundamental contents of the FMP, an RCA is required to be conducted if any of the following flow event situations occur:

- Any discharge to the flare in excess of 14,160 standard cubic meters (m³) (500,000 standard cubic feet (scf)) above the baseline in any 24-hour period²³ [NSPS Ja];

²¹ CBI Ex. (b)(4)

²² CBI Ex. (b)(4)

²³ See 40 CFR §60.103a(c)(1)(ii).

CBI Ex. (b)(4)

- A flow event contains regulated material, the vent gas flow rate exceeds the smokeless capacity of the flare, and visible emissions are present for more than five (5) minutes during any two (2) consecutive hours²⁴ [MACT CC]; or
- A flow event contains regulated material, the vent gas flow rate exceeds the smokeless capacity of the flare, and the flare tip velocity exceeds the maximum flare tip velocity²⁵ [MACT CC].

On June 24, 2020, LBR received a compliance extension from the VIDPNR for compliance obligations related to MACT CC flow events²⁶. This extended the compliance date to one (1) year after restart of an affected flare. CBI Ex. (b)(4)

CBI Ex. (b)(4)

CBI Ex. (b)(4)

Per Table 3.2 in the FMP, the normal operations baseline flow for Flare No. 8 is defined as 500,000 scf per day ("scfd"), which therefore establishes the RCA threshold under NSPS Ja at 1,000,000 scfd. The following table identifies those periods during which flow exceeded the RCA threshold.

Table 2-11 Flare No. 8 NSPS Ja Flow Events since February 2021

Event	Start Time	End Time	Duration (hr)	Max Flow (scfd)	RCA Documentation
1	2/3/2021 4:00	2/3/2021 7:00	3	31,038,249.9	Yes - Doc 18m
2	3/30/2021 21:00	4/8/2021 6:00	201	4,088,562.0	Yes - Doc 18n
3	4/16/2021 14:00	5/22/2021 21:00	871	6,112,473.5	Yes - Doc 18o

CBI Ex. (b)(4)

²⁴ See 40 CFR §63.670(o)(3)(i).

²⁵ See 40 CFR §63.670(o)(3)(ii).

²⁶ CBI Ex. (b)(4)

CBI Ex. (b)(4)

CBI Ex. (b)(4)

Flow data during the third flow event indicate the event exceeded the RCA threshold of 1,000,000 scfd until May 22, but the RCA for that third event lists the time period for that event as ending on May 12. CBI Ex. (b)(4)

It is worth noting that the FMP presents the normal operations baseline flow but does not include a large process unit startup/shutdown flow rate, which would understandably be greater. Recall that the FMP was submitted prior to restarting units at the Refinery and therefore lacked the benefit of actual operating data. CBI Ex. (b)(4)

CBI Ex. (b)(4)

²⁷ CBI Ex. (b)(4)

CBI Ex. (b)(4)

2.3.4 Coker Unit Releases: MACT CC

The Audit is required to evaluate compliance for releases at the coker unit with particular emphasis on the miscellaneous process vent (“MPV”) requirements of MACT CC and the coker steam vent requirements of MACT CC²⁸.

§63.641, “*Miscellaneous process vents* include gas streams that are discharged directly to the atmosphere, gas streams that are routed to a control device prior to discharge to the atmosphere, or gas streams that are diverted through a product recovery device prior to control or discharge to the atmosphere.” The definition of MPVs excludes a number of items, such as pressure relief device discharges, decoking operations, and wastewater collection and conveyance systems. The following table summarizes all vents identified on the P&IDs and their classification with respect to MACT CC.

²⁸ Required under Paragraph 115.i.ii.4 of the Order.

29 CBI Ex. (b)(4)

30 CBI Ex. (b)(4)

CBI Ex. (b)(4)

CBI Ex. (b)(4)

[REDACTED]

CBI Ex. (b)(4)

[REDACTED]

Hot petroleum coke is quenched with water in the coker drums in order to be cooled, which results in the generation of steam and consequently pressurization within the coker drums. T

CBI Ex. (b)

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] The

following table includes those decoking events identified through the open valve to atmosphere.

³¹ As allowed in 40 CFR §63.657(a)(1)(i), compliance with the 2 psig limit can be determined at existing affected sources by taking the average vessel pressure determined on a rolling 60-event average.

CBI Ex. (b)(4)

[REDACTED]

Table 2-13 Decoking Events since February 2021

Decoking Event	Coker Drum ID	Start Time	Pressure at Start of Vent to Atmosphere (psig)
1	8504	2/1/2021 8:51	1.52
2	8503	2/2/2021 7:27	0.27
3	8503	2/8/2021 11:22	0.16
4	8504	3/27/2021 22:02	29.86
5	8504	4/21/2021 9:35	4.28
6	8503	4/21/2021 17:14	11.70
7	8503	4/23/2021 21:49	6.61
8	8504	4/30/2021 9:47	12.37
9	8503	5/2/2021 1:36	5.38
10	8504	5/4/2021 12:25	0.63
11	8503	5/5/2021 21:02	5.78
12	8504	5/7/2021 7:29	2.34
13	8503	5/8/2021 15:26	1.04
14	8504	5/10/2021 4:55	2.97
15	8503	5/10/2021 20:50	0.08
16	8503	5/14/2021 1:23	0.41
17	8504	5/18/2021 22:59	0.00
Average Pressure at Start of Vent to Atmosphere (psig):			5.02

Note that compliance with MACT CC can be evaluated on a rolling 60-event average for existing MACT CC sources³², CBI Ex. (b)(4)

³² See 40 CFR §63.657(a)(1)(i).

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The average pressure among the 17 events when opening the drum to atmosphere was 5 psig, well over the 2-psig limit. Only eight (8) of the 17 decoking events (47%) identified by coker drum valve opening were started when the pressure in the drum was 2 psig or less³³. The remaining events saw the valve open at pressures as high as ~30 psig and then the coker drum depressurized rapidly.

CBI Ex. (b)(4)

The vents that release vapors from the coker during the coker cooling process (i.e., the coker steam vents) and during normal operation are called delayed coker vents, which are defined as MPVs in MACT CC. As required in MACT CC, these MPVs must be routed to a control device if they are defined as Group 1 MPVs³⁴. CBI Ex. (b)(4)

As discussed in Section 2.3.3, many of the MACT CC flaring requirements have an extended compliance deadline that has not yet been triggered. As such, Flare No. 8 is not yet required to follow MACT CC with respect to many of the operational requirements. A summary of applicable MACT CC requirements is presented in the following table.

Table 2-14 MACT CC Regulations and Compliance Status

Regulation 40 CFR §	Summary of Provision	Is Site Complying with Requirement?	Compliance Explanation
63.643(c)	Maintenance vent provisions	CBI Ex. (b)(4)	

³³ CBI Ex. (b)(4) In 40 CFR §63.657(a)(1)(i), the depressurization limit of 2 psig is presented as a whole number and rounding can be applied when determining compliance.

³⁴ See 40 CFR §63.643(a)(1).

Regulation 40 CFR §	Summary of Provision	Is Site Complying with Requirement?	Compliance Explanation
63.648(j)(3)-(7)	Pressure release device management requirements	CBI Ex. (b)(4)	
63.670(b)	Operate flares with a pilot flame present		
63.670(c)	Visible emissions		
63.670(d)	Flare tip velocity		
63.670(e)	Combustion zone operating limits		
63.670(f)	Dilution operating limits for air-assisted flares		
63.670(g)	Monitor presence of pilot flame		
63.670(h)	Visible emissions monitoring		
63.670(i)	Flare vent gas, steam assist, and air assist flow rate monitoring (only obligation to "install" monitoring)		
63.670(i)	Flare vent gas, steam assist, and air assist flow rate monitoring (except obligation to "install" monitoring)		
63.670(j)(1)	Flare vent gas composition monitoring (only obligation to "install" monitoring)		
63.670(j)(1)	Flare vent gas composition monitoring (except obligation to "install" monitoring)		
63.670(k)-(n)	Specific methods to calculate the various operating limits		
63.670(o)(1)	Flare management plan development		
63.670(o)(2)	Flare management plan submission		
63.670(o)(3)-(7)	Root cause and corrective action analyses required for certain emergency flaring events		

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Regulation 40 CFR §	Summary of Provision	Is Site Complying with Requirement?	Compliance Explanation
63.670(p)-(q)	Record maintenance/reports demonstrating compliance with the above-listed provisions are required	CBI Ex. (b)(4)	
63.670(r)	Option to request approval of site-specific operating limits		
63.671(a)	Operate CPMS to comply with §63.670 (only obligation to "install" CPMS)		
63.671(a)	Operate CPMS to comply with §63.670 (except obligation to "install" CPMS)		
63.671(b)	Develop and implement a CPMS quality control program in a CPMS monitoring plan		
63.671(c)	Compliance with "out-of-control" periods		
63.671(d)	Reduce data as specified		
63.671(e)	Comply with additional requirements for gas chromatographs		

* - Compliance deadline extended by VIDPNR to 1 year after flare restart, by letter dated 6/24/2020³⁵.

While many MACT CC flare requirements are not yet applicable, the general flare requirements found in 40 CFR §63.11 in MACT A still apply. This rule governs flare operation to promote proper combustion at the flare. This is done by ensuring that the net heating value of the gas being combusted is higher than the minimum and that the maximum flare tip velocity is not exceeded.

CBI Ex. (b)(4)

³⁵ CBI Ex. (b)(4)

Table 2-15 MACT A Flare Exceedance Events

Event	Start Time	End Time	Duration (hr)	Minimum Net Heating Value (Btu/scf)	Flare Tip Velocity (fps)
1	3/28/2021 11:00	3/28/2021 19:00	8	963.60	80.10
2	3/28/2021 22:00	3/28/2021 23:00	1	940.50	73.40
3	4/21/2021 23:00	4/22/2021 1:00	2	15.80	15.40
4	4/22/2021 15:00	4/22/2021 19:00	4	11.80	18.20

CBI Ex. (b)(4)

2.3.5 Additional Considerations

Though the scope of the Audit is very specifically defined in the Order, the Order also states that the Audit shall not be limited to that well-defined scope “if the Auditor determines that additional evaluation should be conducted to prevent emissions or incidents that could endanger public health or welfare or the environment.”³⁶ CBI Ex. (b)(4)

Continuous Monitoring Systems

CMS are needed to monitor parameters and ensure compliance. The use of a CMS allows for the rapid identification of events that could lead to non-compliant emissions. CBI Ex. (b)(4)

_____ federal regulations limit the amount of acceptable downtime. For sources that are subject to an NSPS, excessive periods of CMS downtime are required to be reported to regulators. In addition, repeated instances of excess emissions are also required to be reported to regulators. Per 40 CFR §60.7(d)(2), if the total duration of excess emissions for the reporting period is one (1) percent or greater of the total operating time or the total CMS downtime for the reporting period is five (5) percent or greater of the total operating time, the summary report and excess emission report described in 40 CFR §60.7(c) shall both be submitted. The summary report and excess emission report described in 40 CFR §60.7(c) are to

³⁶ See Paragraph 115.i of the Order.

CBI Ex. (b)(4)

be submitted semiannually, unless the Administrator has determined that more frequent reporting is necessary.

Based on the data by LBR for the period from February 1-May 27, 2021:

- the East Fuel Gas Drum H₂S CMS exceeds both the excess emissions and downtime thresholds,
- the Coker Fuel Gas Drum H₂S CMS exceeds both the excess emissions and downtime thresholds,
- the Flare No. 8 H₂S CMS exceeds the excess emissions threshold and is narrowly below the downtime threshold, and
- the Flare No. 8 TRS CMS exceeds the downtime threshold.

A detailed compilation of CMS downtime data is provided in the following table.

Table 2-16 CMS Downtime since February 2021

CMS ID	Description	Pollutant	Total Period Time (hr)	Total Downtime (hr)	CMS Downtime (%)
EASTFGDR	East Fuel Gas Drum	H ₂ S	2,760	246	8.91%
COKERFG	Coker Fuel Gas Drum	H ₂ S	2,760	697	25.25%
FLARE08 - H2S	Flare 08 H ₂ S	H ₂ S	2,760	133	4.82%
FLARE08 - TRS	Flare 08 TRS	TRS	2,760	646	23.41%

We recognize that for the purpose of official regulatory compliance and reporting, the semiannual periods are evaluated from January-June and July-December. CBI Ex. (b)(4)

CBI Ex. (b)(4)

CBI Ex. (b)(4)

Risk Management Plan

The Refinery and the Terminal are required to maintain a Risk Management Plan (“RMP”) under the Chemical Accident Prevention Provisions included in 40 CFR Part 68. Unlike an air quality permit, which evaluates and authorizes normal operations, an RMP is intended to evaluate the impacts from potential accidental releases of either toxic or flammable substances in excess of a chemical-specific threshold quantity. An RMP requires:

- certification with EPA every five (5) years,
- a compliance audit of the RMP every three (3) years, and
- a Process Hazard Analysis every five (5) years.

The Refinery and the Terminal are jointly registered with the EPA in a single RMP under Facility ID 100000111176, CBI Ex. (b)(4)

The LBR RMP includes considerations for anhydrous ammonia releases (toxic) and potential vapor cloud explosions of flammable mixtures. Under the RMP regulations, 77 toxic substances and 63 flammable substances are specifically listed³⁷. Included among the regulated toxic substances is hydrogen sulfide (H₂S, Chemical Abstract Registry, or CAS, No. 7783-06-4). The threshold quantity for H₂S is 10,000 lb. Since the LBR RMP includes those chemicals determined to be present above its chemical-specific threshold quantity, it conversely *excludes* those chemicals determined to fall *below* the threshold quantity.

FINDING/RECOMMENDATION #11

CBI Ex. the sulfur-laden releases associated with the three (3) most recent incidents referenced in the Order, CBI Ex. (b)(4)

³⁷ See Tables 1-4 in 40 CFR §68.130. https://www.ecfr.gov/cgi-bin/retrieveECFR?gp=&SID=094812e1514b1474b7203fb34526d3e3&mc=true&n=pt40.17.68&r=PART&ty=HTML#se40.17.68_1130

